Building a Virtual IT Lab at Home - Step-by-Step Documentation

I built a completely free virtual IT Lab from scratch on my home machine, using open-source software. It's fast, flexible, and a great way to gain hands-on IT and cybersecurity skills without needing hardware.

Here in this documentation, I will walk you through step-by-step on how I created a virtual IT lab.

What You'll Need:

- A computer (Windows, MacOS, Linux)
- Internet Connection
- 8GB RAM recommended
- Storage space for virtual machines (40 GB+ recommended)

What is Virtualization?

Virtualization is a technology that enables the creation of virtual environments from a single physical machine, allowing for more efficient use of resources by distributing them across computing environments. - (IBM)

In simple terms, instead of having multiple physical machines, you can create several Virtual Machines that run as software on your main computer. So, the main computer (the host) is the one doing all the work, and on this host you can run one or more guest machines with each own's operating system and settings.

What are Virtual Machines?

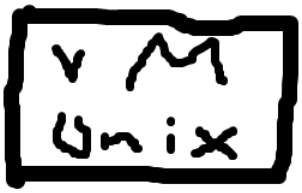
A virtual machine is a software-based computer:

- They run like a physical computer
- Have operating systems and applications
- And completely independent to one another.

As each one is independent, you can run different operating systems on each virtual machine:

Virtual Machine 1 :
Operating System - Windows

Virtual Machine 2:
Operating System - Linux



Virtual Machine 3:
Unix

Virtual machines are ideal for creating your own IT Lab, giving you space to learn, test and build.

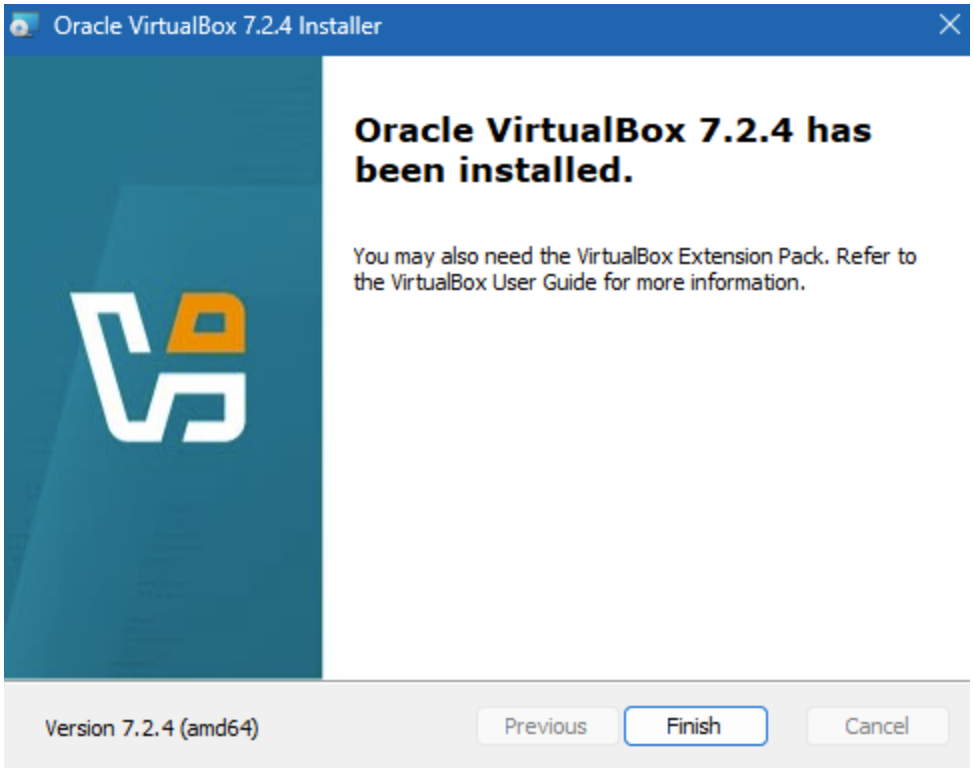
Free Virtualisation Software

For this project, I am using Oracle VM (VirtualBox), because it works on Windows, MacOS and Linux systems. However, feel free to use any other virtualisation tool you prefer as most setups are similar.

Step 1 - Downloading and Installing VirtualBox

Download Oracle VM VirtualBox by clicking here OracleVM. Once the download was complete, I launched the installation.

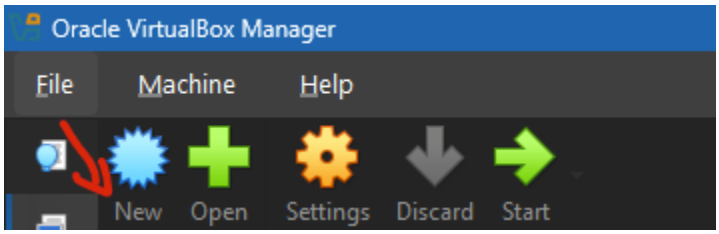
I went through the installation setup using all default options, and when prompted with yes/no questions, I chose “Yes”.



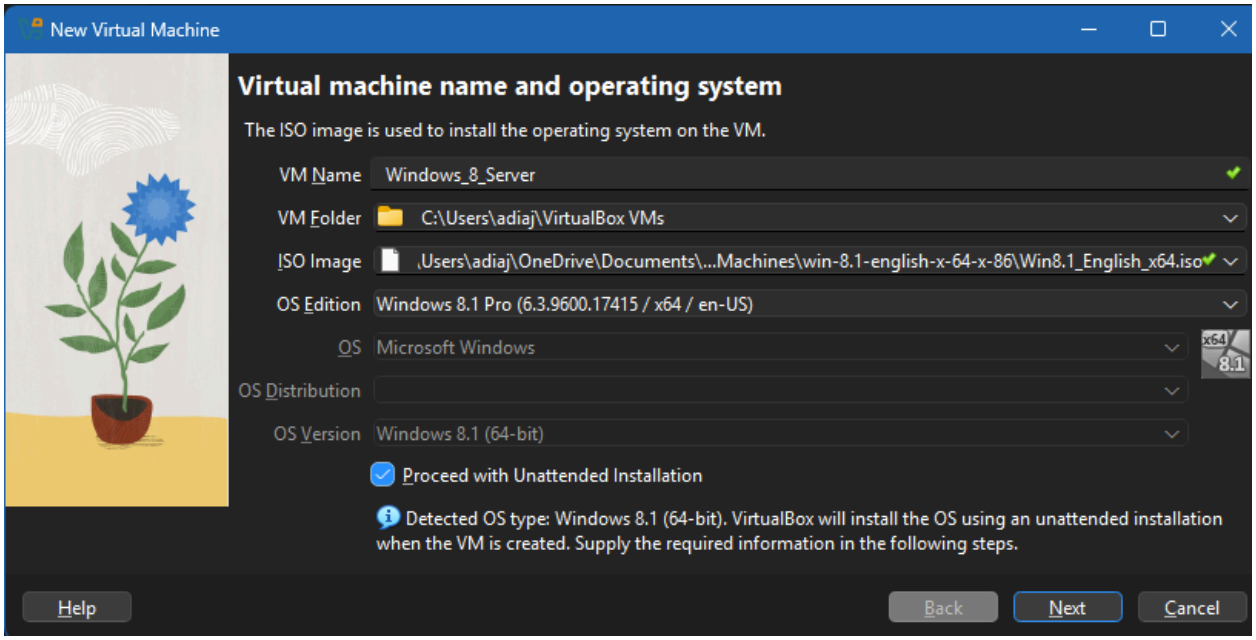
Click Finish and launch VirtualBox.

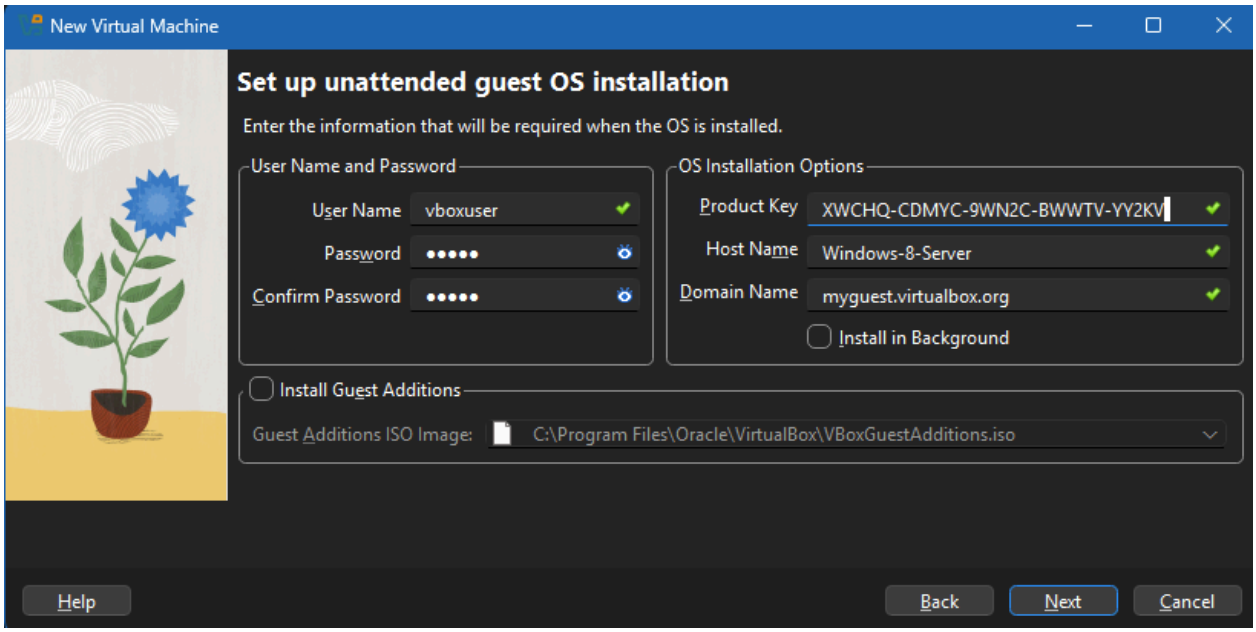
Step 2 - Creating a Virtual Machine

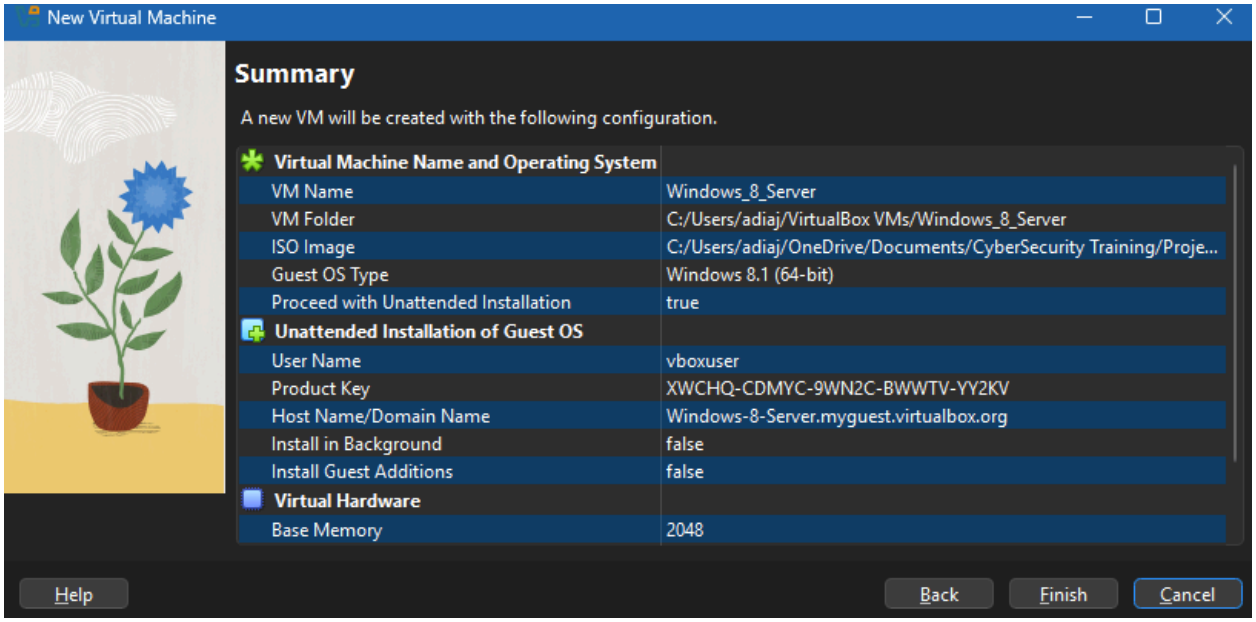
Click the “New” button in the VirtualBox Manager.



1. This will launch the new VM window.
2. When Launched, it will prompt you to input a VM name. I called mine “Windows-8-Server”.
3. Select Operating System type and version (Make sure to have the ISO Image downloaded, I got mine from: Windows8ISOIMAGE)
4. Enter a password when prompted, I put “pass1”(for learning purposes).
5. Enter the product key - XWCHQ-CDMYC-9WN2C-BWWTV-YY2KV
6. Allocate RAM - 2048MB (2GB), Choose 1 CPU, and keep disk size as 40GB
7. Then Click Finish.


New Virtual Machine
Virtual machine name and operating system
The ISO image is used to install the operating system on the VM.
VM Name
Windows_8_Server
VM Folder
C:\Users\adiaj\VirtualBox VMs
ISO Image
,Users\adiaj\OneDrive\Documents\...Machines\win-8.1-english-x-64-x-86\Win8.1_English_x64.iso
OS Edition
Windows 8.1 Pro (6.3.9600.17415 / x64 / en-US)
OS
Microsoft Windows
OS Distribution
OS Version
Windows 8.1 (64-bit)
Proceed with Unattended Installation
Detected OS type: Windows 8.1 (64-bit). VirtualBox will install the OS using an unattended installation when the VM is created. Supply the required information in the following steps.
Help
Back
Next
Cancel


New Virtual Machine
Set up unattended guest OS installation
Enter the information that will be required when the OS is installed.
User Name and Password
User Name
vboxuser
Password
Confirm Password
OS Installation Options
Product Key
XWCHQ-CDMYC-9WN2C-BWWTV-YY2KV
Host Name
Windows-8-Server
Domain Name
myguest.virtualbox.org
Install in Background
Install Guest Additions
Guest Additions ISO Image:
C:\Program Files\Oracle\VirtualBox\VBoxGuestAdditions.iso
Help
Back
Next
Cancel

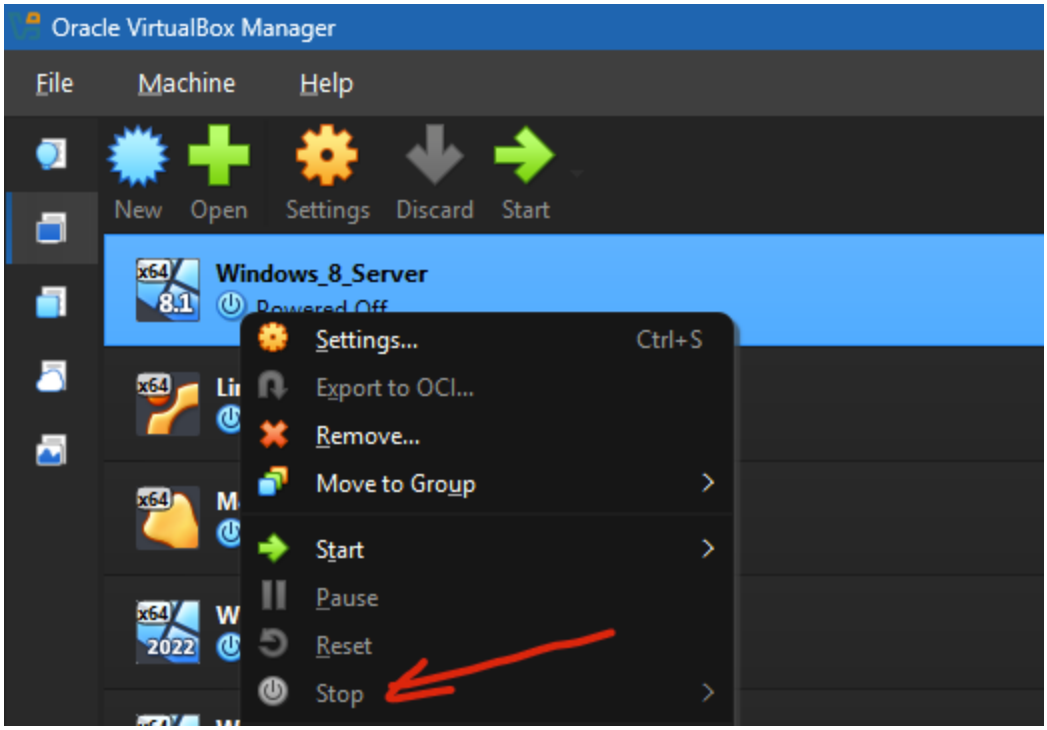


Now the virtual machine will be visible on your VirtualBox Dashboard

Please note, once the Virtual machine is created, it will automatically start running. To power it off:

1. Right Click the Virtual Machine
2. Navigate to Stop
3. Once Hovered Over, click “Power off”

In the screenshot below, my VM is already powered off:

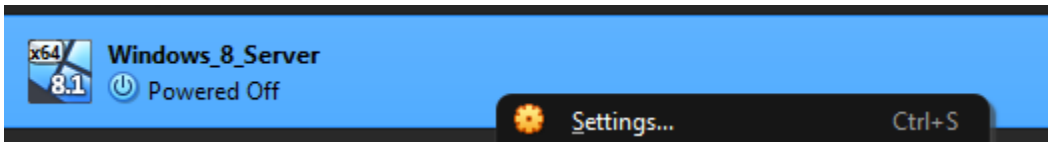


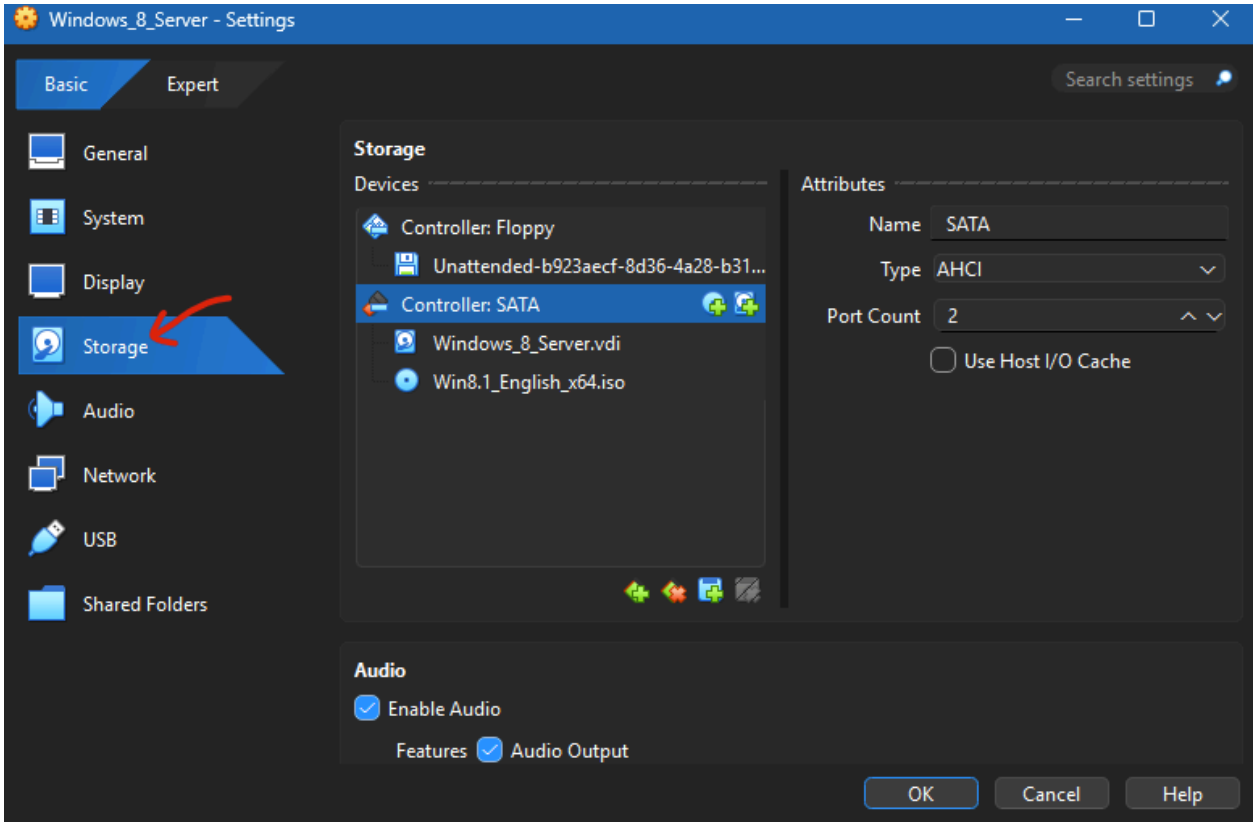
Step 3 - Downloading an Operating System (OS)

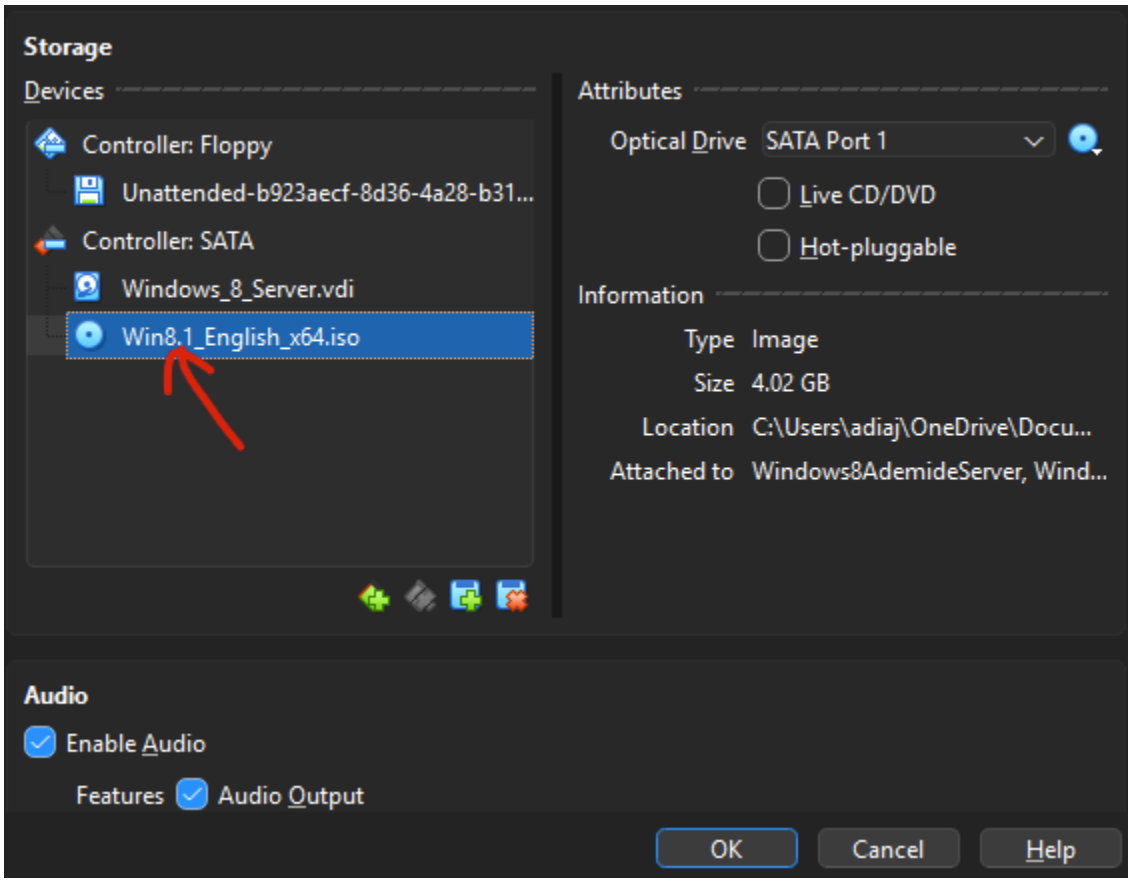
You will need an ISO File - a digital copy of an operation system. (Won't have to worry about this as we downloaded it when creating the virtual machine).
Please do note, the file takes up a lot of space and takes time to download.

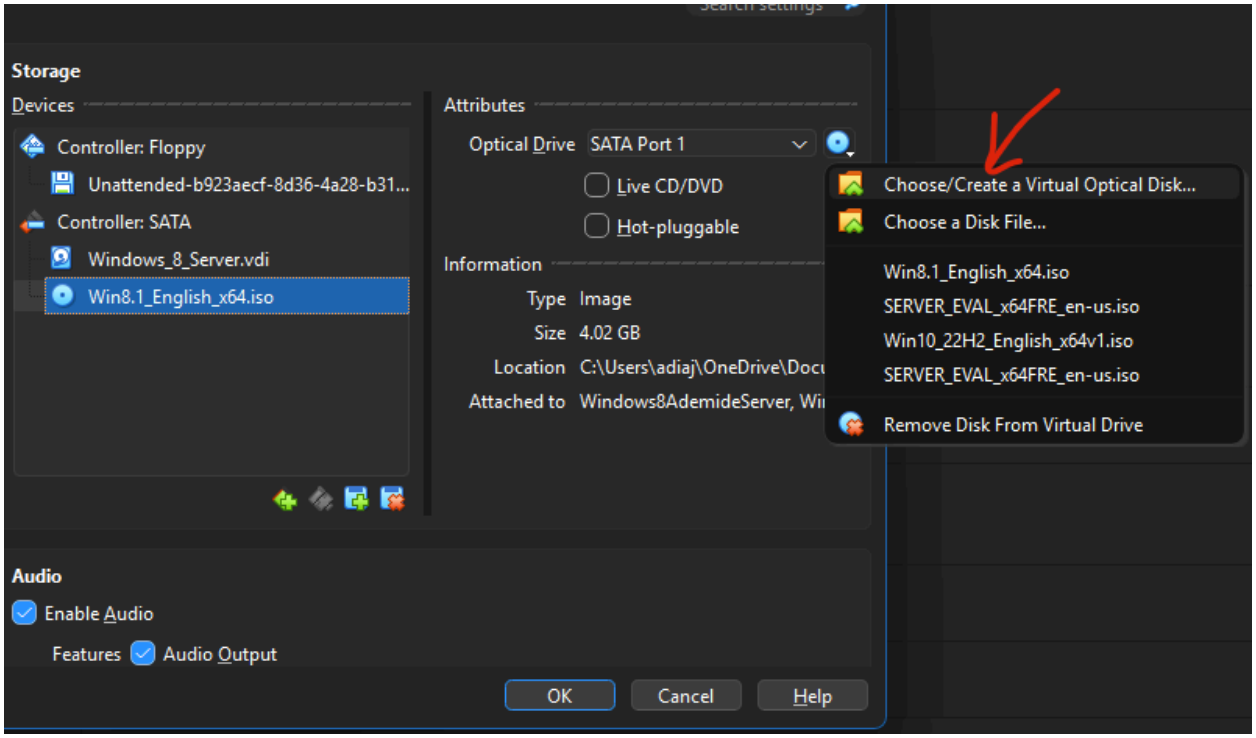
Step 4 - Mount the ISO and Install the OS

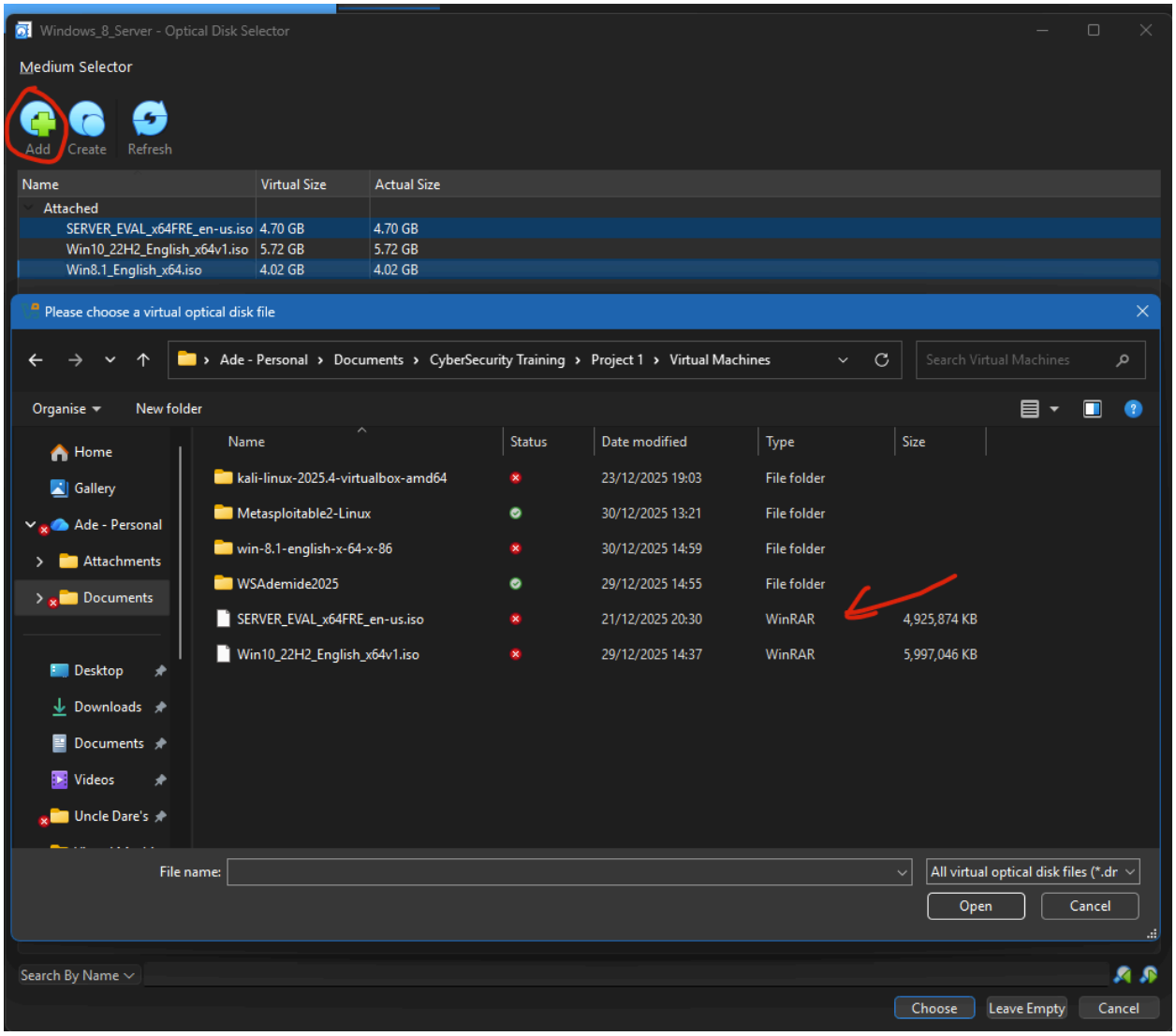
1. Right click your VM and Select Settings
2. Navigate to Storage
3. Click the blue CD icon
4. Underneath Attributes, click the blue CD icon and choose "Choose/Create Virtual Optical Disk"
5. Then Click "Add", this will then open up your file explorer.
6. Navigate to the iso file you have downloaded, select it and click "Open"
7. Then In the Optical Disk Selector, click on your iso file and on the bottom right corner of that window click "Choose"

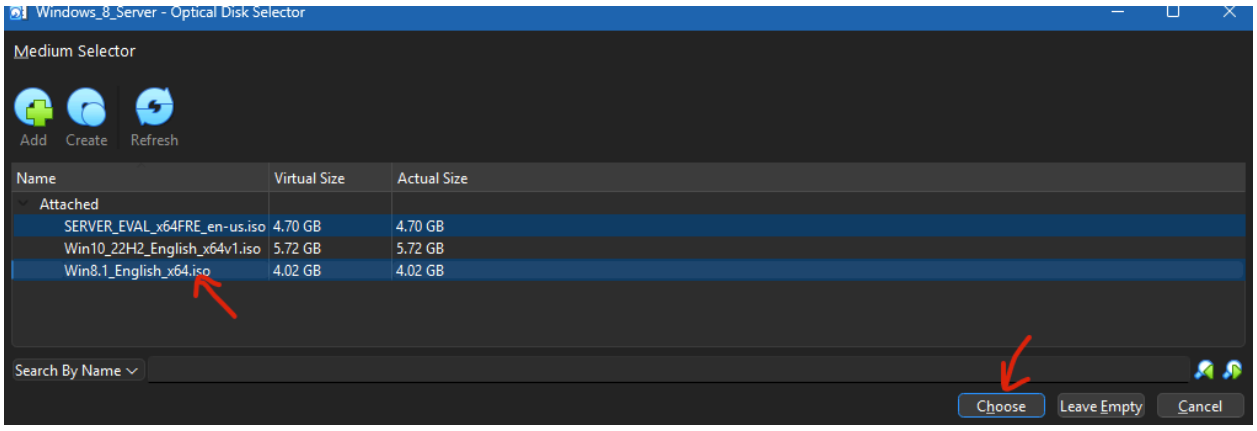



Windows_8_Server - Settings
Basic
Expert
Search settings
General
System
Display
Storage
Audio
Network
USB
Shared Folders
Storage
Devices
Controller: Floppy
Unattended-b923aecf-8d36-4a28-b31...
Controller: SATA
Windows_8_Server.vdi
Win8.1_English_x64.iso
Attributes
Name
SATA
Type
AHCI
Port Count
2
Use Host I/O Cache
Audio
Enable Audio
Features
Audio Output
OK
Cancel
Help


Storage
Devices
Controller: Floppy
Unattended-b923aecf-8d36-4a28-b31...
Controller: SATA
Windows_8_Server.vdi
Win8.1_English_x64.iso
Attributes
Optical Drive
SATA Port 1
Live CD/DVD
Hot-pluggable
Information
Type
Image
Size
4.02 GB
Location
C:\Users\adiaj\OneDrive\Docu...
Attached to
Windows8AdemideServer, Wind...
Audio
Enable Audio
Features
Audio Output
OK
Cancel
Help


Storage
Devices
Controller: Floppy
Unattended-b923aecf-8d36-4a28-b31...
Controller: SATA
Windows_8_Server.vdi
Win8.1_English_x64.iso
Attributes
Optical Drive
SATA Port 1
Live CD/DVD
Hot-pluggable
Information
Type Image
Size 4.02 GB
Location C:\Users\adiaj\OneDrive\Docu
Attached to Windows8AdemideServer, Wi
Choose/Create a Virtual Optical Disk...
Choose a Disk File...
Win8.1_English_x64.iso
SERVER_EVAL_x64FRE_en-us.iso
Win10_22H2_English_x64v1.iso
SERVER_EVAL_x64FRE_en-us.iso
Remove Disk From Virtual Drive
Audio
Enable Audio
Features
Audio Output
OK
Cancel
Help





Step 5 - Configure Your Virtual Network

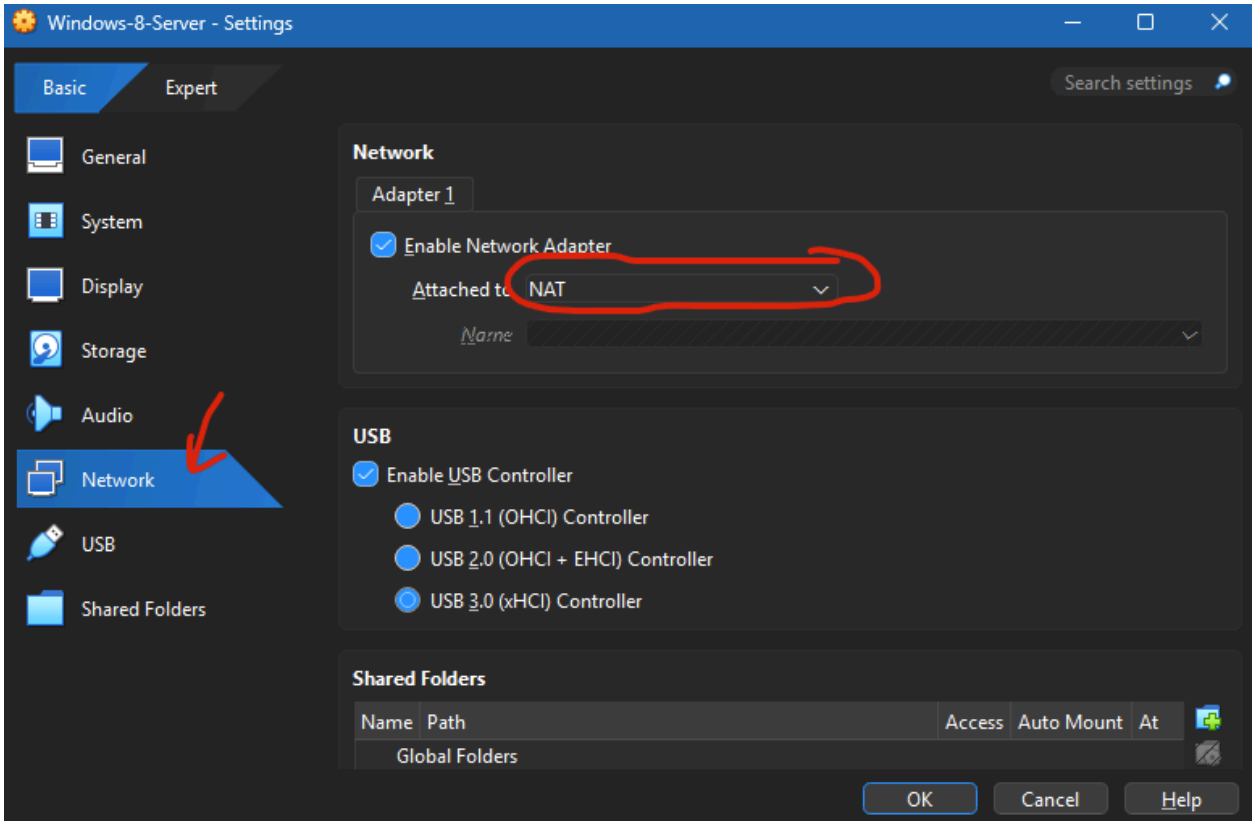
VirtualBox offers several networking types. For most labs, NAT Network is recommended.

Let's set up a NAT network:

1. Right Click on your VM
2. Navigate to Network
3. Hover over "Attached to" and on the drop down select "NAT" (if it's already assigned, leave it).
4. Click, OK.

Other network types:

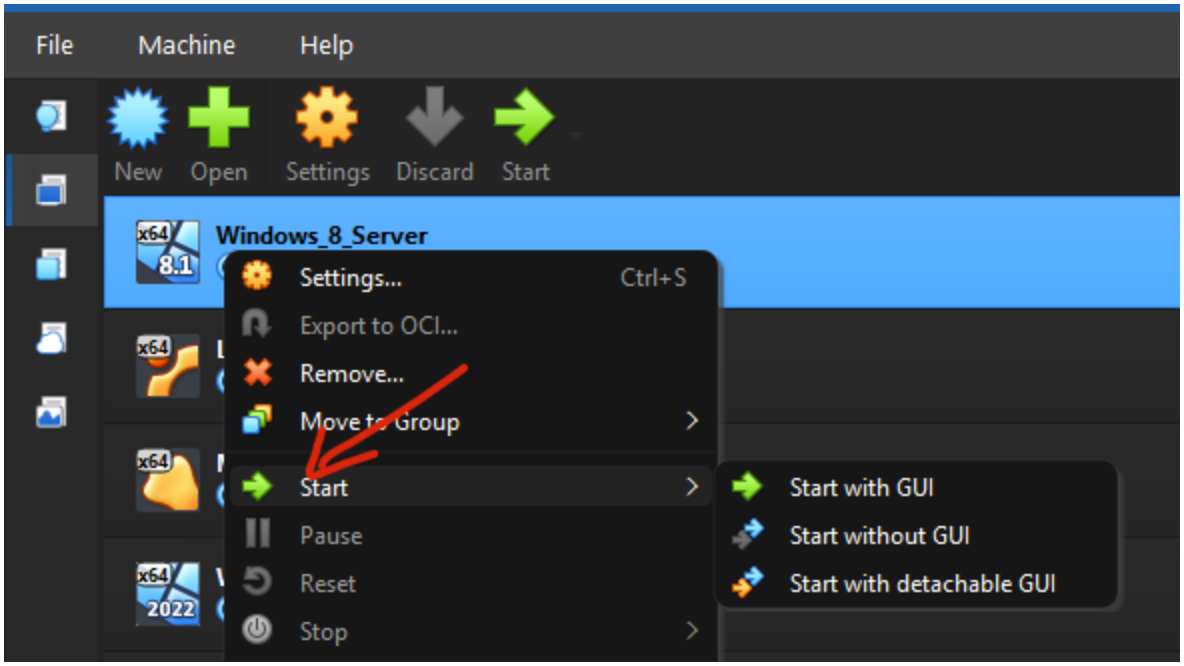
Bridged: VM acts like a separate device on your home network.



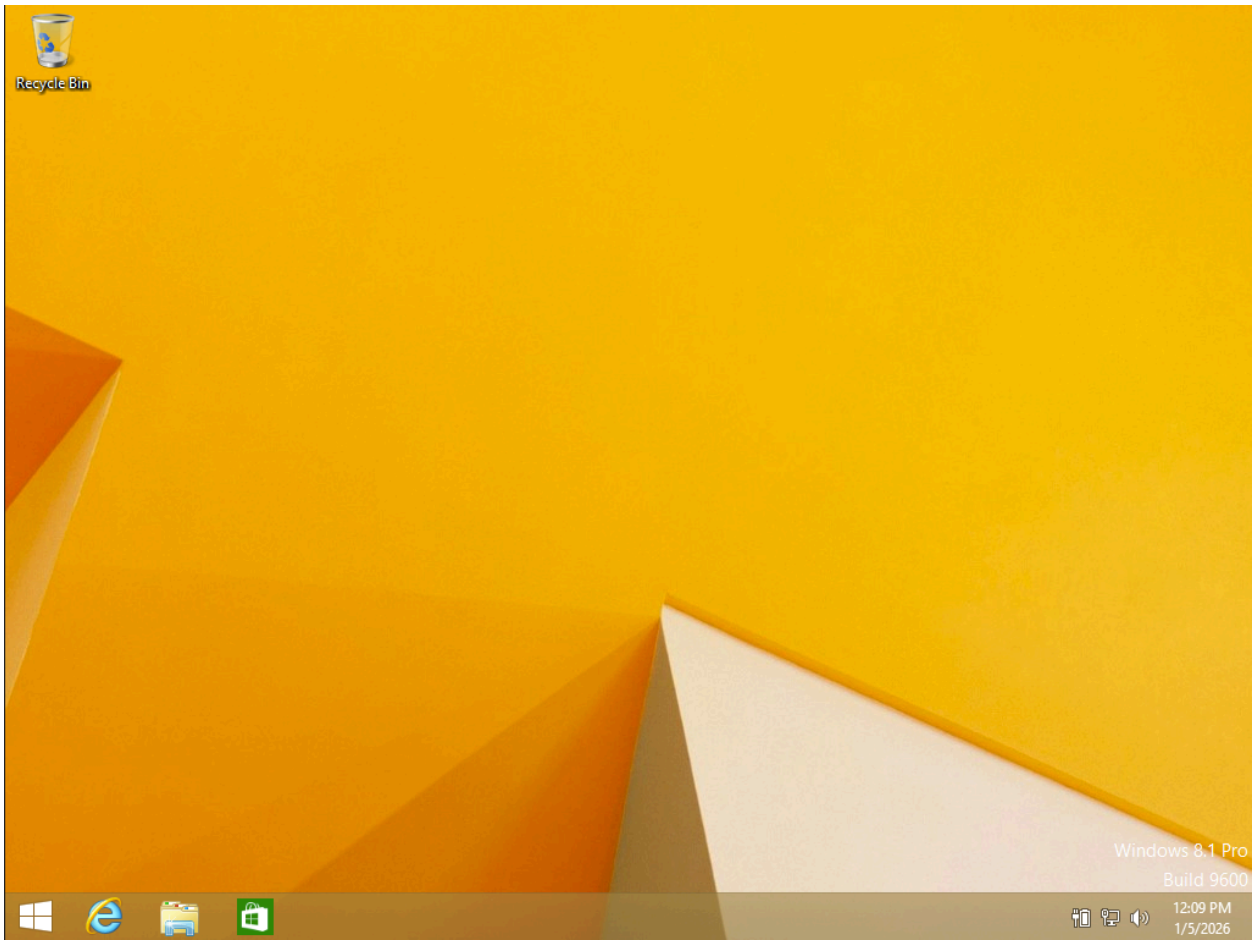
Step 6 - Booting up the Virtual Machine

Now let's start the Virtual Machine:

1. Navigate to the VM
2. Hover over the Start Button
3. Choose "Start with GUI"
4. Then the OS Installation will begin- follow the on-screen prompts.



After completing the installation sequence, you now have a working virtual machine:



Summary

With your virtual machine, virtual network, and operating system in place, you have everything you need to start building hands-on IT Lab and gaining real-world experience - right from your own machine.

What we achieved:

1. Created a Virtual machine
2. Chosen and downloaded an operating system ISO
3. Set up a virtual network
4. Prepared everything for building a hands-on IT Lab.